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Abstract

Evidence of dramatic industrialisation has been used to support the optimistic, staple theory-inspired narrative of Argentina's late nineteenth century. This narrative is challenged here by an analysis of the available evidence of industrial output in Argentina from the 1870s to the eve of the First World War. Issue is taken, in particular, with Roberto Cortés Conde's widely used industrial output index, which suggests an 8-9 per cent annual industrial growth rate during this period. It is argued that Cortés Conde has overestimated growth by relying upon misleading data taken from Argentina's inland revenue service. Rather than reflecting increased production, the rapid growth of Cortés Conde's index is actually due to increased taxation. Alternative indicators show a lower annual growth rate of 5 per cent, although this is necessarily an approximation, given the lack of data. The cases of textiles and beef products illustrate why the lack of data makes it easy to overestimate industrial growth during this period, as there tends to be more data for dynamic activities than for those that stagnated. The paper concludes with a discussion of wider implications for the study of economic history.

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(Mis)measuring Argentina's Progress: Industrial Output, 1870s-1913

Joseph A. Francis

D.C.M. Platt's warning of the increasing use of 'Mickey Mouse numbers' by economic historians has largely gone unheeded.[1] Indeed, the triumph of the New Economic History has seen the use of dubious historical statistics become ever more widespread. Determined to empirically test hypotheses derived from neoclassical economics, economic historians have generally worked on the assumption that any number is better than no number at all. Questions relating to the quality of those numbers have largely gone unasked.

This paper uses a case study to demonstrate the kinds of problems that exist in the statistics that economic historians routinely use. It focuses on Roberto Cortés Conde's attempts to estimate Argentina's industrial output in the late nineteenth and early twentieth centuries.[2] It begins by describing how Cortés Conde's numbers have reinforced an optimistic vision of Argentina's 'golden age' prior to the First World War. Problems with his estimates are then demonstrated through an examination of the sources and methodology that underlie them. Crucially, it is shown that Cortés Conde depended upon data taken from Argentina's inland revenue service. In doing so, he appears to have mistaken a rapid increase in the quantity of goods being taxed for an equivalent growth in the quantity being produced, leading to a considerable upward bias in the growth rate of his index. Other available indicators suggest a significantly lower growth rate, although even this finding should only be considered approximate, given that the data are of poor quality and provide a narrow coverage of industry. The cases of beef products and textiles are then used to demonstrate why the lack of data can lead to overestimates of Argentina's industrial growth in this period: there tend to be more data for dynamic activities than for those that stagnated. This is, the paper argues, one example of why economic historians need to be more careful about which numbers they use.

From Pessimism to Optimism

The rise of the New Economic History has been associated with a swing towards optimism in the historiography of Argentina in the half century prior

1. D.C.M. Platt, *Mickey Mouse Numbers in World History: The Short View*, Basingstoke, 1989.
2. R. Cortés Conde, 'Estimaciones del producto bruto interno de Argentina 1875-1935', Documento de Trabajo 3, Departamento de Economía y Matemática, Universidad de San Andres, 1994.

to the First World War.[3] A pessimistic vision of this period had previously dominated. In the 1960s and '70s most historians believed that Argentina had missed an important opportunity in the late nineteenth century. Inspired by the interwar 'revisionist' critiques of foreign domination, as well as 'structuralism', the post-war Latin American critique of neoclassical economics, they argued that the country's rapid 'outward-oriented' growth had been unbalanced and had not laid the foundations for more long-term development. Such a pessimistic vision was shared by proponents of 'modernisation theory' and 'dependency theory' alike. Nonetheless, by the end of the twentieth century the pendulum had swung decisively towards a far more optimistic, (neo)liberal vision, according to which Argentina had experienced a 'golden age' due to its successful pursuit of 'export-led development'.

The early pessimism of Roberto Cortés Conde is particularly notable because he would subsequently become one of the most prominent optimists, producing influential accounts of Argentina's progress in the late nineteenth and early twentieth centuries.[4] In the 1960s, by contrast, his work had reflected the consensus that Argentina's rapid growth prior to the First World War had represented a missed opportunity.[5] External circumstances, he claimed, had been highly favourable for the country, allowing it to prosper by bringing new land into production through a rapid expansion of the frontier. This extensive growth was, however, limited by the closing of the frontier and vulnerable to changes in the external environment, especially given that the country had failed to industrialise. The result was that Argentina's apparent prosperity was more illusion than reality. Cortes Condé wrote:

> Testimonies of the time speak clearly enough of the sudden luxury of the until recently austere society of the River Plate; the ostentatious buildings and a way of life that came close to the [...] richest and most sophisticated capitals of Europe. [...]

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3. For overviews, see R. Cortés Conde, 'Export-Led Growth in Latin America: 1870-1930', *Journal of Latin American Studies*, 24, Quincentenary Supplement, 1992, pp. 168-72.; and E.J. Míguez, '¿Veinte años no es nada? Balance y perspectivas de la producción reciente sobre la gran expansión agraria, 1850–1914', in J. Gelman, ed., *La historia económica argentina en la encrucijada*, Buenos Aires, 2006.
4. R. Cortés Conde, *El progreso argentino: 1880-1914*, Buenos Aires, 1979; 'The Export Economy of Argentina 1880-1920', in idem and S.J. Hunt, eds., *The Latin American Economies: Growth and the Export Sector 1880-1930*, New York, 1985; 'The Growth of the Argentine Economy, *c*. 1870-1914', in L. Bethall, ed., *The Cambridge History of Latin America*, V, c. *1870-1930*, Cambridge, 1986; *La economía argentina en el largo plazo: Ensayos de historia económica de los siglos XIX y XX*, Buenos Aires, 1997; and 'The Vicissitudes of an Exporting Economy: Argentina (1875-1930)', in E. Cárdenas, J.A. Ocampo, and R. Thorp, eds., *An Economic History of Twentieth-Century Latin America*, I, *The Export Age*, Oxford, 2000.
5. R. Cortés Conde, 'El 'boom' argentino: ¿una oportunidad desperdiciada?', in T. di Tella and T. Halperín Donghi, eds., *Los fragmentos del poder*, Buenos Aires, 1969; also 'Problemas del crecimiento industrial de la Argentina (1870-1914)', *Desarrollo Económico*, 3:1/2, 1963; and E. Gallo and R. Cortés Conde, *La formación de la Argentina moderna*, Buenos Aires, 1967.

> This fact created the impression that [Argentina] had reached the levels of the most progressive and industrialised countries, and to some extent it had: a European population, extensive education, urban centres, such as Buenos Aires, that had little to envy in those of old Europe. Yet something was lacking. Behind the advanced urban Argentina was a virtually pastoral society. *There was no correlate industrial development.* When circumstances changed and the external impetus disappeared, we found that the castle had been built on air.[6]

For Cortés Conde and others, 'staple theory' provided a framework for a more optimistic (re)vision of Argentina's late nineteenth century.[7] Inspired by the work of Harold Innis,[8] Canadian historians had argued that the rapid expansion of their country's export sector in the nineteenth century had generated linkages with other sectors, leading to more broad-based growth, including industrialisation.[9] In a highly influential study, Carlos Díaz Alejandro claimed that Argentina's growth had fitted this pattern[10] – a claim that Ezequiel Gallo reinforced with his observation that industry had also grown rapidly at the beginning of the twentieth century, in the midst of the export sector's great expansion.[11] Staple theory thus allowed these scholars to advance a more optimistic (re)vision of Argentina's late nineteenth century that was opposed to the pessimistic consensus that had previously prevailed. Cortés Conde would reinforce that (re)vision with a series of studies of Argentina's prosperous Pampean region.[12]

Arguably, however, Cortés Conde's most important contribution would be his estimates of industrial output. In a 1994 working paper he verified the optimistic (re)vision by producing historical gross domestic product (GDP) statistics that showed rapid industrialisation occurring alongside the export expansion.[13] Cortés Conde found that industry grew at an extraordinary trend rate of 8.4 per cent per year during 1875-1913, compared to an annual growth rate of just 4.5 per cent for agriculture.[14] In a revised version of his estimates, the

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6. Cortés Conde, ''Boom' argentino', p. 241, my translation and emphasis.
7. For example, Cortés Conde, 'Export Economy', pp. 170-71; and 'Growth of the Argentine Economy', p. 355.
8. H. Innis, *Essays in Canadian Economic History*, Toronto, 1956.
9. The first major statement came from M.H. Watkins, 'A Staple Theory of Economic Growth', *Canadian Journal of Economics and Political Science*, 29:2, 1963; cf. 'Staples Redux', *Studies in Political Economy*, 79, 2007. Also see A.O. Hirschman, 'A Generalized Linkage Approach to Development, with Special Reference to Staples', *Economic Development and Cultural Change*, 25, Supplement, 1977.
10. C.F. Díaz Alejandro, *Essays on the Economic History of the Argentine Republic*, New Haven, 1970, pp. 9-11.
11. E. Gallo, 'Agrarian Expansion and Industrial Development in Argentina', in R. Carr, ed., *Latin American Affairs*, Oxford, 1970; also L. Geller, 'El crecimiento industrial argentino hasta 1914 y la teoría del bien primario exportable', *Trimestre Económico*, 37:148(4), 1970.
12. Cortés Conde, *Progreso argentino*; 'Export Economy'; and 'Growth of the Argentine Economy'.
13. Cortés Conde, 'Estimaciones del producto'.

industrial growth rate then increased to 8.7 per cent.[15] Both the original and the revised version of Cortés Conde's estimates thus confirmed the optimistic staple theory-inspired narrative of rapid industrialisation accompanying export-led growth.

Cortés Conde's numbers have subsequently become a mainstay of the economic historiography. Their impact can be understood by placing them within the context of the debate about Argentina's industrialisation as it stood when the working paper was released. A prominent literature review explained that the debate between pessimists and optimists had been brought to an impasse due to the lack of data:

> [T]he discussion ceased before it had finished, probably because it could only go on producing more of the same arguments with the tools available. Thus the estimates of the economic indicators on which many of these studies were based were not revised. Nor did researchers undertake a search of the primary sources that would have allowed them to line up new evidence.[16]

Cortés Conde's numbers ended this impasse, inspiring other researchers to verify his finding of rapid industrialisation using more fragmentary data.[17] Yet, few looked at Cortés Conde's methodology, nor, crucially, did they attempt to replicate his results – a task that will be undertaken in this paper. It will be shown that only the lack of such checks has allowed Cortés Conde's numbers to feature so prominently in the optimistic accounts of Argentina's late nineteenth century.

What Did Cortés Conde Do?

Cortés Conde's industrial output index combines series for nine industries, weighted according to their shares of value added in 1914.[18] Table 1 reproduces the weights assigned to the nine components and summarises the sources that were used to calculate the output for each over the period 1875-1913. As can be

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14. The trend growth rate is calculated as the coefficient of the exponential trendline. All growth rates given in this paper are calculated in this way.
15. Cortés Conde, *Economía argentina*, pp. 230-31, Cuadro A1; also *The Political Economy of Argentina in the Twentieth Century*, Cambridge, 2009, p. 309, Table A.9.
16. J.C. Korol and H. Sabato, 'Incomplete Industrialization: An Argentine Obsession', *Latin American Research Review*, 25:1, 1990, pp. 23-24.
17. F. Rocchi, *Chimneys in the Desert: Industrialization in Argentina During the Export Boom Years, 1870-1930*, Stanford, 2006, esp. pp. 21, 24-25, 42; and M.I. Barbero and F. Rocchi, 'Industry', in G. della Paolera and A.M. Taylor, eds., *A New Economic History of Argentina*, Cambridge, 2003, esp. pp. 264-65; also Y. Pineda, *Industrial Development in a Frontier Economy: The Industrialization of Argentina, 1890-1930*, Stanford, 2009.
18. Cortés Conde based his calculation of industry's value added on the industrial census, which actually recorded value added in 1913. To that figure he made various additions, especially for meat production in abattoirs, together with industrial production outside factories. Cortés Conde, 'Estimaciones del producto', pp. 8-11.

Table 1

Components of Cortés Conde's Industrial Output Index

	Start year[a]	% of total[b]	% of index[c]	Sources for output estimates
Beer	1876	2.7	6.3	During 1876-92, the quantity of hops imports. From 1892, from the internal revenue returns.
Dairy	1894	2.2	5.3	During 1894 to 1903, a percentage of exports. From 1903, official production statistics from *Revista de Economía Argentina*.
Flour	1875	2.5	6.0	During 1875-1907, implicit wheat consumption, calculated as wheat production plus imports minus exports, with wheat production estimated from official statistics of the amount of land in cultivation published in *Estadística Agrícola*. From 1908, official production statistics published in *Estadística Agrícola* and *Revista de Economía Argentina*.
Flour products	1875	4.0	9.6	Implicit flour consumption, calculated as flour production plus imports minus exports.
Meat	1875	14.7	34.9	Exports plus domestic consumption. The latter is estimated as a function of population and the price of meat.
Sugar	1875	5.7	13.5	During 1875-92, the area cultivated with sugarcane. From 1892, from the government's internal revenue returns.
Textiles	1879	2.2	5.3	From 1879, a percentage of the value of dirty wool exports, the value of yarn imports, and the value of raw cotton production, which were summed together and deflated by an index of imported cloth prices.
Tobacco	1900	3.8	9.1	Apparent consumption of tobacco as a raw material, calculated as tobacco production plus imports, minus exports. Production is from the internal revenue returns.
Wine	1892	4.2	10.0	During 1892-1903, the internal revenue returns. During 1903-12, production is interpolated using census data on cultivated land or value of output (it is unclear which) for 1908 and 1914. During 1912-13, official production statistics from *Estadística Agrícola*.

[a] First year of output estimates. [b] Percentage of industry's total value added in 1914.
[c] Percentage of the sample's total value added in 1914.

Source: Cortés Conde, 'Estimaciones del producto', pp. 10-11, 13-14.

seen, Cortés Conde's estimates are based on a combination of trade data, official statistics of land in cultivation, and the revenues from the taxes that were levied on the production of a variety of goods from the 1890s onwards.

What Cortés Conde has revealed about the evolution of each of these components suggests that the index is flawed, to say the least. He has published the average annual growth rates for food and textiles, together with the index as a whole, as reproduced in Table 2. The most curious aspect of these numbers is that the overall output index has an extremely high growth rate for the 1890s, even though food processing, which was by far the largest sector, grew much more slowly. Thus, food accounted for 69 per cent of the value of the index in its 1914 base year but only grew at 4.2 per cent annually during 1890-1900, while the total index grew by 11.5 per cent. In purely mathematical terms, it seems difficult to explain such an elevated total growth rate, given that the dominant

Table 2

Cortés Conde's Industrial Growth Rates, 1875-1910

	Annual growth rate, %		
	Total	Food	Textiles
1875-1890	5.2	5.6	3.9
1890-1900	11.5	4.2	12.7
1900-1910	7.8	6.7	7.4

Source: Cortés Conde, *Economía argentina*, pp. 207, 209, Cuadros 15 and 17.

component of the index grew at a much lower rate. It could not have been due to the rapid expansion of the textile component, given that the latter made up only 5 per cent of the total index in its 1914 base year. Rapid growth must therefore have been driven by the non-food and non-textile components. Tobacco products are only included in the index from 1900 onwards, which just leaves beverages, so it can be assumed that the rapid growth of industrial output in the 1890s was driven by beer and wine, the two beverages that respectively made up 6 and 10 per cent of Cortés Conde's index in 1914. These weights, together with those given to food and textiles, suggest that beverage output must have somehow expanded at around 40 per cent per year during 1890-1900 to produce the overall annual growth rate of 11.5 per cent. Such a high growth rate for beverages seems implausible until Cortés Conde's original sources are consulted.

The fundamental problem with Cortés Conde's industrial output index appears to be its dependence upon data from Argentina's inland revenue service. For both beer and wine, this data begins in the 1890s, when taxes began to be levied on some industrial production. The data are reproduced in Tables 3 and 4. They show that the litres of beer being taxed increased at an annual trend rate of 11 per cent during 1891-1900, while the litres of wine being taxed grew by an incredible 60 per cent per year during 1892-1900. The two combined could, then, account for Cortés Conde's 11.5 per cent annual industrial growth rate for 1890-1900. If this is so, the problem is fairly obvious: in reality, there was no such dramatic increase in wine output; rather, the 60 per cent annual growth rate in the 1890s merely reflected the extension of the taxes being levied. So-called 'natural wines', which made up the vast bulk of production, were only taxed for the first time in 1898, when a levy of four cents per litre was introduced.[19] The quantity of wine taxed thus increased dramatically, but it was not a result of an equivalent growth in production. By contrast, the land cultivated with vines multiplied by an estimate of the wine yield, which is a more accurate

19. P. Barrio de Villanueva, 'Controles estatales a la industria del vino en Mendoza, 1890-1914', *H-industri@*, 4:7, 2010, pp. 8-9, available online at http://www.hindustria.com.ar/images/client_gallery/HindustriaNro7Barrio.pdf (accessed 14 May 2013).

Table 3

Production Tax Data for Beer, 1891-1900

	Production taxed			Tax revenues (m$n)	Taxes levied (m$n)				
	Total (lts)	Casks (lts)	Bottles		Single extract, per lt	Double extract, per lt	Per bottle, less than 40 cl	Per bottle, more than 40 cl	Casks, per lt
1891	7,220,680			267,855	0.02	0.05			
1892	10,743,179			267,477	0.01	0.03			
1893	11,887,430			457,680	0.02	0.05			
1894	12,477,070			355,341	0.01	0.03			
1895	15,080,314			427,648	0.03	0.03			
1896	16,085,334			482,560	0.03	0.03			
1897	15,526,721			742,935	0.05	0.05			
1898	15,236,990			761,849	0.05	0.05			
1899	19,697,825	8,165,862	15,375,950	928,693			0.02	0.035	0.05
1900	26,509,972[a]	10,328,365	21,575,476	1,155,509			0.02	0.035	0.05

[a] Based on the assumption that each bottle equalled 0.75 lt, as in 1899.

Sources: Compiled from Dirección General de la Estadística de la Nación (DGEN), *Anuario*, Buenos Aires, 1897, II, pp. 47-48; 1898, II, p. 102; 1899, II, pp. 73-74; 1900, II, pp. 215-216; 1901, II, pp. 285-86; and E. Tornquist, *The Economic Development of the Argentine Republic in the Last Fifty Years*, Buenos Aires, 1919, pp. 295, 298-99.

Table 4

Production Tax Data for Wine, 1892-1900

	Production taxed (lts)			Tax revenues (m$n)	Taxes levied (m$n)					
	Total	Natural	Others		Natural (per lt)	Artificial (per lt)	Blended and petiot (per lt)	Watered or altered (per lt)	Raisin (per lt)	Fortified (per degree exceeding 16°)
1892	5,597,155	0	5,597,155	560,433		0.10				
1893	258,849	0	258,849	25,885		0.10				
1894	1,233,587	0	1,233,587	123,359		0.10				
1895	15,250,208	0	15,250,208	159,502		0.10				
1896	5,111,651	0	5,111,651	281,428		0.12	0.04	0.07	0.02	
1897	1,286,155	0	1,286,155	95,211		0.12	0.06	0.07	0.02	0.01
1898	49,524,723	47,815,010	1,709,713	1,906,745	0.04	0.12	0.06	0.07	0.02	0.01
1899	122,821,727	121,200,652	1,621,075	3,508,963	0.02	0.14	0.08	0.09	0.04	
1900	125,910,730	125,076,954	833,776	3,624,805	0.02	0.14	0.08	0.09	0.04	

Sources: As in Table 3.

indicator of output, grew at an annual rate of roughly 6 per cent during the 1890s.[20] Cortés Conde thus appears to have grossly overestimated the expansion of wine output by mistaking an increase in the quantity of wine *being taxed* with the quantity *being produced*. Moreover, given that the state's capacity to collect these taxes probably increased after they were first introduced, it seems likely that there would be an upward bias in the trend of other output series calculated using internal revenue service data. They are, in other words, likely to produce growth rates that are too high. Cortés Conde's reliance on this source thus raises significant doubts over the reliability of his index.

Alternative Indicators[21]

Other data support the impression that Cortés Conde overestimated Argentina's industrial growth. Proxies for physical output in various industries are summarised in Table 5. With the exception of sugar, they are not direct measures of output but mainly relate to the apparent supply of raw materials and other inputs, which have been compiled from trade and agricultural statistics. Exports are also used for some industries, and in some cases estimates have been made for domestic consumption.

Estimating domestic consumption in particular required a considerable amount of guesswork. For beef products, per capita domestic consumption was estimated using the ratio between meat prices and wages. As will be discussed further below, the result suggests that beef consumption fell from over 100 kg per capita in the 1880s and '90s to around 75 kg prior to the First World War, as the growth of chilled and frozen beef exports pushed up prices on the domestic market, while other foodstuff became cheaper due to increasing supply. Hence, whereas for most of the century, the consumption of dairy products had largely been confined to the upper classes, it became widespread as the expansion of the domestic dairy industry lowered prices.[22] To reflect this pattern, consumption in 1875 was estimated to be 0.3 kg of butter and 0.5 kg of cheese per capita, but then rose to 0.7 kg and 1.2 kg respectively during 1909-13. For the later period, these consumption levels were calculated from official output and trade statistics. For butter, the earlier consumption level was estimated by extrapolating back the trendline of per capita consumption for 1903-13, while for cheese it was based on the amount of cheese imported, assuming minimal domestic production. Such guesswork means that these indicators' margins of error are

20. The yield was estimated based on the trendline of the yield for 1900-1913. Calculated from Dirección General de Economía y Estadística (DGEE), *Estadística Agrícola: Año Agrícola 1913-14*, Buenos Aires, 1914, p. 18; and Comité Nacional de Geografía (CNG), *Anuario geográfico argentino*, Buenos Aires, 1941, p. 227.
21. For the data and calculations discussed in this section, see the Appendix and the workbook available at http://www.joefrancis.info/data/Francis_Arg_ind_v2.xlsx.
22. I. Zubizarreta and F. Gómez, *Una historia de la lechería argentina: desde la colonia hasta nuestros días*, Inforcampo, 2013.

Table 5

Indicators of Industrial Growth for Argentina, 1870s-1913

	Start year	Annual trend growth rate, %	% of 1913 value added[a]	Indicators[b]
Beef products[c]	1875	3.3	8.6	Tons of cattle slaughtered. Slaughtered for domestic consumption was calculated by multiplying population by per capita consumption, estimated using a regression between per capita consumption and the beef price/wage ratio during 1914-39. Slaughtered for export was estimated by extrapolating back from the figure for 1914 using exports of chilled, conserved, jerked, and frozen beef, all at 1914 prices.
Beer	1876	7.0	3.8	Hops imported.
Clothing	1883	2.9	3.2	Common sewing thread reels imported.
Cottage yarn and cloth[d]	1869	-3.3	0.2	Number of spinners and weavers in the population censuses, minus the number of factory yarn and cloth workers in the industrial censuses, multiplied by m$n53, at 1913 prices.
Dairy	1875	7.4	3.2	Production statistics for 1903 and 1905-13 for butter and 1905-13 for cheese. For previous years, net exports plus domestic consumption, with both valued at 1913 export prices. Domestic butter consumption was calculated by multiplying population by per capita consumption, estimated using the trendline for consumption per capita during 1903-13. Domestic cheese consumption was assumed to be 0.5 kg per capita in 1875, with subsequent years interpolated.
Factory cloth	1887	18.9	1.5	Imports of cotton and wool yarn.
Flour	1876	7.8	3.6	Production statistics for 1895 and 1907-13. For other years, apparent wheat consumption, calculated as wheat production based on cultivated land multiplied by the wheat yield estimated using the trendline for 1891-1913, minus net exports, multiplied by the flour yield calculated using data for 1895 and 1907-1913. The flour yields for 1896-1906 were interpolated, and they were extrapolated back to 1876-94 using the trendline for 1895-1913.
Flour products	1876	7.1	6.8	Apparent flour consumption, calculated from flour production, minus net flour exports.
Iron and steel	1876	7.8	6.7	Imports of iron bars, steel bars, and worked iron.
Matches	1893	9.7	1.4	Imports of yarn for matches.
Paper	1892	10.7	0.6	Imports of paper paste.
Printing	1883	9.7	3.3	Imports of printers' ink.
Sacks	1880	9.2	0.8	Imports of sacking material.

Table 5 (cont.)

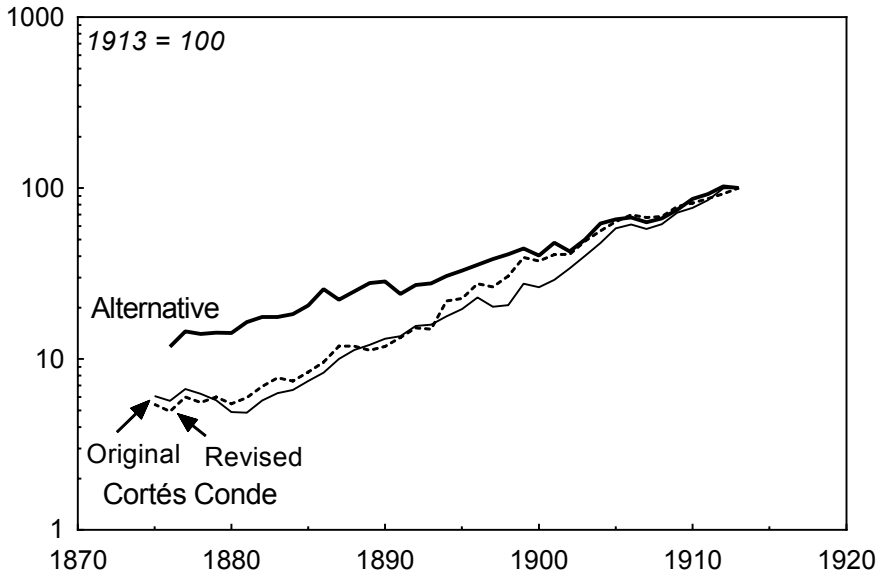
	Start year	Annual trend growth rate, %	% of 1913 value added[a]	Indicators[b]
Sugar	1872	10.2	8.2	Production statistics.
Tobacco	1876	4.1	5.5	Apparent consumption of raw tobacco. For 1901-13, production, minus net exports. For 1876-1900, raw tobacco production was calculated as cultivated land multiplied by yield. Yield was estimated using the trendline for 1901-13.
Wine	1873	7.9	6.1	Production statistics for 1900-13. For 1873-1899, land cultivated multiplied by the trendline yield of wine per hectare cultivated for 1900-13.

[a] Value added in 1913 was calculated from the industrial census by subtracting the cost of raw materials from the gross value of output. [b] Unless otherwise specified statistics refer to physical quantity by weight. [c] The 1913 census value added of beef products was adjusted upward to take into account abattoirs, which were not included in the census. The census value was therefore divided by 0.6, based on the assumption that cattle slaughtered for meatpacking, canning, and salting represented 60 per cent of value added while cattle slaughtered in abattoirs represented 40 per cent. [d] The cottage textile industry was underrepresented by the industrial census, so its value added in 1913 was estimated from the numbers occupied in textiles in the population census, and the value added of the cottage producers who were included in the census.

Sources: 1913 value added weights: calculated from Comisión Nacional del Censo (CNC), *Tercer censo nacional*, VII, *Censo de las industrias*, Buenos Aires, 1917. Beef price/wage ratio: see the text below. Cattle slaughtered: CNG, *Anuario geográfico*, p. 268; and Junta Nacional de Carnes (JNC), *Estadísticas básicas*, Buenos Aires, 1966, p. 7. Cottage yarn and cloth: see the text below. Cultivated land and yields: calculated from DGEE, *Estadística Agrícola: 1913-14*, p. 18; and CNG, *Anuario geográfico*, pp. 207, 227, 245, 340. Imports and exports: F. Latzina, *Estadística retrospectiva del comercio exterior argentino 1875-1904*, Buenos Aires, 1905; DGEN, *Extracto estadístico de la República Argentina correspondiente al año 1915*, Buenos Aires, 1916, pp. 54-73; and *Anuario*, various years. Population: V. Vázquez-Presedo, *El caso argentino: migración de factores, comercio exterior y desarrollo, 1875-1914*, Buenos Aires, 1971, p. 92; and *Crisis y retraso: Argentina y la economía internacional entre las dos guerras*, Buenos Aires, 1978, p. 191, Cuadro V.1. Production statistics: CNG, *Anuario geográfico*, pp. 230, 245, 275-76, 340.

Figure 1

Three Estimates of Argentina's Industrial Output, 1870s-1913



Note: Cortés Conde's indices begin in 1875. The alternative index begins in 1876.

Sources: Alternative: see text and Table 5. Cortés Conde: Original: Cortés Conde, 'Estimaciones del producto'; Revised: Cortés Conde, *Economía argentina*, pp. 230-31, Cuadro A1.

significant.

If caveats are put to one side, however, the indicators listed in Table 5 suggest a considerably lower industrial growth rate. Some industries did expand at around the rate suggested by Cortés Conde: factory cloth, matches, paper, printing, and sugar probably increased by at least 9 per cent annually; flour, iron and steel, and wine by 8 per cent. Nonetheless, indicators for other industries show far slower growth: tobacco products grew by 4 per cent per year; beef products and clothing by 3 per cent; cottage yarn and cloth contracted by 3 per cent. With each series weighted by their 1913 value added in the industrial census, they provide an index with a 5 per cent annual growth rate, which, as shown in Figure 1, is considerably slower than the 8-9 per cent rate suggested by Cortés Conde.[23] To put the difference in perspective, agricultural output also increased by roughly 5 per cent per year during this period,[24] so the impression of dramatic industrialisation given by Cortés Conde's numbers is misleading. Rather, industry probably grew at around the same rate as agriculture.

This finding must be treated as probable, rather than definite, because the sample of indicators still suffers from the fundamental issues of *quality* and *cov-*

23. For the construction of this index and the underlying series, see the accompanying workbook at http://www.joefrancis.info/data/Francis_Arg_ind.xlsx.
24. Calculated from Cortés Conde, 'Estimaciones del producto'.

erage. Thus, the series included in the alternative index are of decidedly mixed quality. Some required considerable guesswork in their calculation, such as the domestic consumption of beef and dairy products, as described above. Others, particularly some of the imported inputs, may not be highly accurate indicators of output. What is more, the industries represented accounted for perhaps 60 per cent of industrial value added in the 1913 base year. While this is an improvement on the 42 per cent coverage of Cortés Conde's index,[25] it is still below the 70-80 per cent coverage that a reliable index would need. Significant industries such as leather and wood products are not included at all. In this, as with the problem of quality, the index suffers from the basic lack of data on industrial output in Argentina in this period. Two case studies – beef products and textiles – illustrate why this lack of data is so problematic.

Meatpackers and Abattoirs

Argentina was renowned for its beef exports in the late nineteenth century, when refrigerated steamships began to take Argentine meat to the British market.[26] Trade statistics confirm the explosive growth: during 1885-1913 the physical quantity of frozen beef exports increased at an annual trend rate of 34 per cent, while chilled beef exports took off later, growing at 52 per cent per year during 1908-13.[27] The meatpacking companies that prepared this meat for export were one of the most visible signs of the country's growing industrial sector. Yet, as suggested by Table 5, the output of beef products as a whole probably grew by just 3 per cent per year. To understand why, it is necessary to look at salting plants and beef produced for domestic consumption, which were less dynamic, thus pushing down the growth of beef products as a whole.

Even as the exports of refrigerated beef took off at the end of the long nineteenth century, Argentina's salting plants declined dramatically. Jerked beef had previously been one of the country's growth industries, as exports expanded at a rate of around 7 per cent per year from independence in 1810 to the mid-1870s.[28] Growth then slowed, however, to just 2 per cent annually until the mid-1890s, when exports began to collapse for several reasons: growing protectionism in Brazil and Cuba, the main export markets; increased taxation by the Argentine government; and greater competition for cattle with the burgeoning meatpacking industry.[29] Having peaked at 55,000 tons in 1895, jerked beef

25. Cortés Conde, 'Estimaciones del producto', pp. 10-11.
26. S.G. Hanson, *Argentine Meat and the British Market: Chapters in the History of the Argentine Meat Industry*, Stanford, 1938, chs. 3-5.
27. Calculated from DGEN, *Extracto estadístico*, p. 58.
28. Export statistics in this paragraph are from DGEN, *Extracto estadístico*; S. Amaral, *The Rise of Capitalism on the Pampas: The Estancias of Buenos Aires, 1785-1870*, Cambridge, 1998, pp. 318-19, Table C.1; and M.A. Rosal and R. Schmit, 'Del reformismo colonial borbónico al libre comercio: Las exportaciones pecuarias del Río de la Plata (1768-1854)', *Boletín del Instituto de Historia Argentina y Americana 'Dr Emilio Ravignani'*, 3:20, 1999, p. 80, Cuadro 2.

exports fell to less than 4,000 tons in 1913.

Further depressing the growth rate of beef products, domestic meat consumption grew more slowly than exports. Despite an annual population growth rate of 3.3 per cent during 1875-1913, the tonnage of cattle being slaughtered for domestic consumption probably increased by just 2 per cent per year due to the falling amount of meat being eaten per capita. Given Argentines' notorious appetite for beef, the idea that beef consumption per capita fell during the country's 'golden age' seems puzzling. To understand why, it is necessary to appreciate how monotonous diets had been up to that point. In the first half of the nineteenth century, beef became exceptionally cheap because it was a byproduct of the rapidly expanding hide trade. Hence, in Buenos Aires in the second half of the 1880s, an unskilled labourer working for the police could buy around 360 kilos of beef with his monthly wage. The purchasing power of his wage then fell to 225 kilos of beef by the eve of the First World War, as the devaluation of the peso in the 1890s and the take off of refrigerated beef exports pushed up prices for domestic consumers. This ratio of wages to prices can be used to estimate per capita domestic consumption.[30] The result suggests a 2 per cent growth rate during 1875-1913.

The estimate for beef products as a whole combines the volume of jerked,

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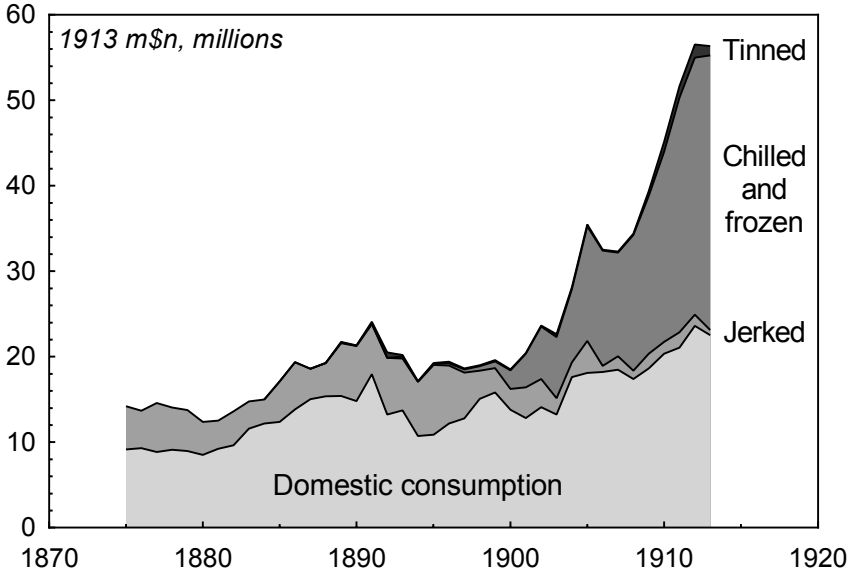
29. Hanson, *Argentine Meat*, pp. 102-06.

30. Beef prices for 1875-1902, 1904-06, and 1909 were estimated using a regression of cattle prices and beef prices for the years 1851-57, 1903, 1907-08, and 1910-13. The prices were taken from R. Cortés Conde, T. Halperin Donghi, and H. Gorostegui de Torres, 'Evolución del comercio exterior argentino: Tomo I Exportaciones: Parte primera 1864-1930', mimeo, 1965, p. 73; C. Llorons do Azar, 'Precios unitarios de consumo y servicios, Capital Federal y provincias: 1901-06: parte primera', mimeo, 1965, pp. 5-6; and F.E. Barba, *Aproximación al estudio de los precios y salarios en Buenos Aires desde fines del siglo XVIII hasta 1860*, La Plata, 1999. Wages to 1875-1914 are from J. Balán and N. López, 'Burguesías y gobiernos provinciales en la Argentina: la política impositiva de Tucumán y Mendoza entre 1873 y 1914', *Desarrollo Económico*, 17:67, 1977, p. 430. The police labourer's wage was spliced in 1914 with an official series for wages in Buenos Aires. Per capita beef consumption was then regressed on the wage/beef ratio for 1914-39, with the resulting formula applied to the wage/beef ratio for 1875-1913 to estimate per capita consumption for this period. For 1914-39, beef consumption from JNC, *Estadísticas básicas*, p. 15; beef prices from Llorons do Azar, 'Precios unitarios', pp. 5-6; and wages from wages from DGEN, *Síntesis estadística mensual de la República Argentina*, 1:3, 1947, p. 2. The wage/beef price ratio for 1914-39 was then regressed on per capita beef consumption over the same period, with the resulting equation applied to the wage/beef price ratio for 1875-1913 in order to estimate per capita consumption. The results suggest domestic beef consumption was 101 kilos in the second half of the 1870s, rose to 107 in the 1880s, but then fell to 74 kilos during 1909-13. By way of comparison, fairly reliable statistics for the City of Córdoba suggest per capita consumption of 179 kilos in the 1820s and 122 kilos in the 1840s, so the high levels of meat consumption found for the beginning of this period do not seem unfeasible. See C.S. Assadourian, *El sistema de la economía colonial: mercado interno, regiones y espacio económico*, Lima, 1982, p. 241. The per capita consumption levels were multiplied by population in order to arrive at production for domestic consumption.

Figure 2

Beef Products Value Added in Argentina, 1875-1913



Sources: see the text.

refridgerated, and tinned beef exports with the estimate of domestic consumption, leading to an overall annual growth rate of 3 per cent.[31] As shown in Figure 2, beef products grew slowly from the mid-1870s to 1900, but then expanded more rapidly due to exports of refrigerated meat. This much-celebrated expansion of the meatpacking industry came at the expense, however, of the abattoirs producing for domestic consumption, as Argentines responded to relatively higher beef prices by diversifying their diets to include a wider range of food, while exports of jerked beef contracted dramatically in part due to greater competition for cattle with the meatpackers. The growth of the new meatpacking industry thus helped depress the growth of the more traditional beef products, leading to a lower overall growth rate.

Cottages and Factories[32]

The process of new industries depressing traditional industries can be seen even more clearly in the case of textiles. For much of the nineteenth century,

31. It was assumed that exports accounted for 60 per cent of beef products' value added in 1913 and domestic consumption 40 per cent. This is based on official statistics that suggest that half of the tonnage of cattle slaughtered were destined for export in 1913 but with the assumption that they contributed more to value added because there was more preparation of the meat by the meatpackers. Estimated from CNG, *Anuario geográfico*, p. 268; and JNC, *Estadísticas básicas*, pp. 5, 7.
32. The data and calculations underlying this section are available online at http://www.joe-francis.info/data/Francis_Arg_textiles.xlsx.

textiles were among the largest of Argentina's (proto)industries. Indeed, textile production had been an important activity for many peasant communities in the Interior since the colonial era,[33] and continued to be so into the 1870s,[34] only to decline thereafter, as cottage producers were put out of business by cheaper imported yarns and fabrics and the rising cost of raw materials.[35] Yet, while these processes are well known, quantifying them is far from easy.

Cortés Conde includes an estimate of textile output in his index, but it relies on assumptions that go beyond heroic. Hence, he calculates textile production by summing a percentage of the value of dirty wool exports, the value of raw cotton production, and the value of yarn imports, then deflating the total by an index of imported cloth prices.[36] In practice, this means assigning roughly equal weights to dirty wool exports and yarn imports, given that raw cotton production was minimal. The problem is that there is not even a remotely credible estimate of the domestic processing of wool prior to 1908,[37] so Cortés Conde cannot have used a reliable series for this part of his calculations. Most likely, he simply took a fixed percentage of dirty wool exports, which says nothing about the growth and fluctuations in the amount of wool processed domestically. There is no reason to suppose, then, that half of Cortés Conde's textile index should be correlated with textile output.

This dubious methodology is of particular concern because it makes one of the key losers from Argentina's nineteenth-century progress disappear from view. The national population censuses reported a dramatic decline in the number of textile producers. In 1869 the first national census found 98,195 textile producers, with 94 per cent of them located in the Interior provinces, where they made up fully 20 per cent of the labour force.[38] Cottage textile production ceased to be a viable occupation, however, once cheaper factory-made fabrics flooded the Interior's markets following the arrival of the railways from the 1880s onwards. The number of textile producers fell to just 35,148 by 1914.[39]

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33. P. Santos Martínez, *Las industrias durante el Virreinato (1776-1810)*, Buenos Aires, 1969, pp. 38-50
34. M. Llorca-Jaña, *The British Textile Trade in South America in the Nineteenth Century*, Cambridge, 2012, pp. 257-67.
35. D.J. Guy, 'Women, Peonage, and Industrialization: Argentina, 1810-1914', *Latin American Research Review*, 16:3, 1981.
36. Cortés Conde, 'Estimaciones del producto', p. 14.
37. CNG, *Anuario geográfico*, pp. 273-75.
38. Calculated from Superintendente del Censo, *Primer censo de la República Argentina*, Buenos Aires, 1872, pp. 642-69.
39. Calculated from CNC, *Tercer censo nacional*, IV, *Población*, Buenos Aires, 1916, pp. 201-329. This fall is slightly exaggerated because the 1869 census includes child workers, whereas the 1914 census only recorded the occupations of those aged 14 and over. However, only 6 per cent of textile workers in a computer-coded sample of 100,944 returns from the 1869 census were below 14 years of age, so applying that percentage to the figure of 94,882 textile workers would still suggest a fall from 89,189 in 1869. The computer-coded sample

Notably, they did not find alternative employment: the participation of working-age women in the labour force in the Interior fell from around 76 per cent in 1869 to 41 per cent in 1914.[40]

Using census and trade data, it is possible to provide an indication of how the declining cottage industry affected total textiles output. The 1913 industrial census found 8,172 'adult' (that is, fourteen-year-old and over) personnel in textile mills and cloth factories,[41] while the 1914 population census found 29,782 people describing themselves as spinners and weavers.[42] The difference between these figures suggests that there were 21,610 cottage textile producers. The vast majority were not recorded by the industrial census. Nonetheless, it did register 1,500 wool spinners in Salta and 2,112 people producing 'cloths made in domestic workshops' scattered across several northern provinces.[43] The returns for the two groups can be used to approximate the value added of cottage production. According to the industrial census, the 3,612 cottage producers had an average value added of m$n53 per capita in 1913.[44] Multiplied by the 21,610 textile producers who were not employed in factories, this suggests a total value added of cottage yarn and cloth of m$n1.2 million.[45] Based on the plausible assumption that there was no change in per capita productivity,[46] that figure can be extrapolated back using the occupation censuses of 1869 and 1895.[47] In this way, the number of cottage textile producers is used as a proxy for

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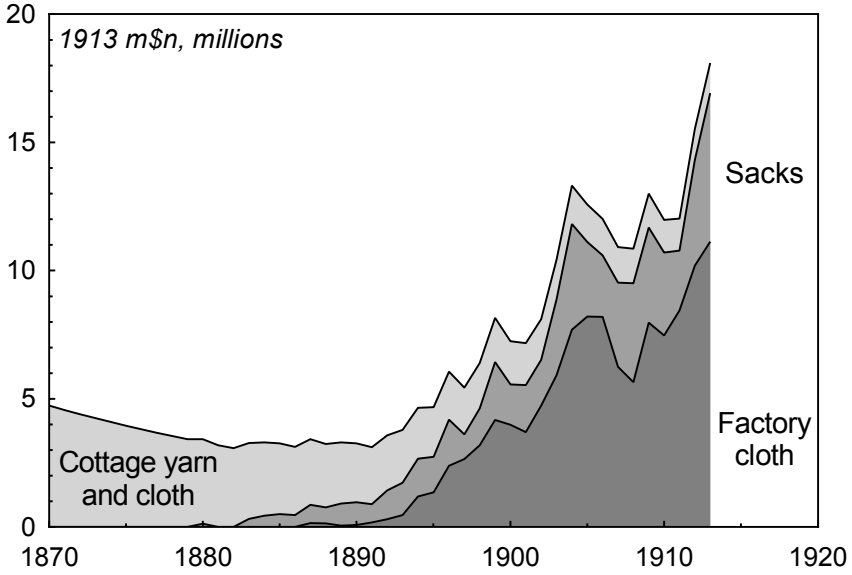
was originally described in J.L. Somoza and A.E. Lattes, 'Muestras de los dos primeros censos nacionales de población, 1869 y 1895', Documento de Trabajo 46, Centro de Investigaciones Sociales, Instituto Torcuato Di Tella, 1967. More recently Somoza and Lattes' raw data was made available as part of the IPUMS-International Census Microdata Harmonization Project. See R. McCaa, M.R. Haines, and E.M. Mulhare, 'Argentina: The First National Historical Census Microdata', in P.K. Hall, R. McCaa, and G. Thorvaldsen, eds., *Handbook of International Historical Microdata for Population Research*, Minneapolis, 2000. The data are online at http://www.hist.umn.edu/~rmccaa/data/argentine_censuses_19thc.zip (accessed 1 September 2013).

40. Participation in the labour force is calculated as all those declaring an occupation as a percentage of all women aged 14 and over. For 1869, estimated from Somoza and Lattes, 'Muestras de los dos primeros censos'. For 1914, calculated from CNC, *Tercer censo nacional*, IV, pp. 201-329. This was not due to an ageing female population retiring from the labour force, as there was no significant increase in the proportion of older women in the overall population. Among women aged 14 and over in the Interior in the 1869 census sample, 4 per cent were aged 60 and above. According to the 1914 census, 7 per cent were. Calculated from CNC, *Tercer censo nacional*, III, *Población*, Buenos Aires, 1916, pp. 19-294.
41. CNC, *Tercer censo nacional*, VII, *Censo de las industrias*, Buenos Aires, 1917, pp. 325, 401-02.
42. CNC, *Tercer censo nacional*, IV, *Población*, Buenos Aires, 1916, p. 387.
43. Calculated from CNC, *Tercer censo*, VII, pp. 325, 401-02.
44. Calculated from ibid., pp. 125, 191-92, 325, 401-02.
45. This is the 29,782 people describing themselves as spinners and weavers found by the population census, minus the 8,172 personnel aged fourteen and over working in cotton and wool mills and cloth factories found by the industrial census, multiplied by m$n53.
46. Per capita productivity was unlikely to have increased because it was minimal in 1913, so probably would not have been lower previously.

Figure 3

Textiles Value Added in Argentina, 1870-1913



Sources: See the text.

output from the 1870s to 1913.

When this estimate of cottage textile industry output is compared to the level of mechanised textile production, the results are striking. In Figure 3 it is added to estimates of the output of factory cloth and sacks, which have been calculated using imports of yarn and sacking respectively.[48] If this factory output is taken into account without any estimate of cottage production, the impression is of a textile sector emerging from nowhere at the beginning of the 1880s to grow explosively at a rate of 19 per cent per year during 1880-1913. When the estimate of the cottage industry is added, it suggests, by contrast, stagnation in the 1870s and '80s, followed by rapid growth only thereafter. For this reason, the annual growth rate of the combined series falls to just 3.4 per cent during 1869-1913.

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47. For 1895, the 3,098 textile personnel found by the 1895 industrial census is subtracted from the 39,380 spinners and weavers found by the population census, with the result multiplied by 53 to arrive at the 1895 cottage yarn and cloth output in 1913 m$n. For 1869, all 92,604 spinners and weavers from the population census are again multiplied by m$n53. All years between the censuses are interpolated exponentially. Calculated from Superintendente del Censo, *Primer censo*, pp. 642-69; Comisión Directiva, *Segundo censo de la República Argentina*, II, *Población*, Buenos Aires, 1898, pp. cxc-cxci; and III, *Censos complementarios*, Buenos Aires, 1898, p. 270.

48. These proxies are reasonable because these industries were predominantly processing imported intermediate goods. Value added for 1913 was taken from CNC, *Tercer censo*, VII, p. 31, and the imports of yarn and sacking were compiled from Latzina, *Estadística retrospectiva*; and DGEN, *Anuario*, various years.

Much as in the case of beef products, then, it seems easy to overestimate industrial growth in Argentina during this period because the most dynamic activities left a clear statistical record. Increasing yarn imports were a clear indicator of an expanding factory-based textiles industry, but it was not, as Fernando Rocchi's metaphor would have it,[49] a case of chimneys emerging in the desert. Argentina had a long-standing cottage textile industry, which stagnated in large part due to the growth of the new factory-based industry. By only taking into account the readily available indicators of the latter's expansion, it is easy to overestimate the growth of textiles as a whole, as the losers from Argentina's progress disappear from view.

Any Number or No Number?

This paper has discussed the problems involved in measuring Argentina's industrial output in the late nineteenth century. Particular attention has been given to Cortés Conde's industrial output index because only he has been sufficiently bold to construct an estimate going back to the 1870s. It has been argued that the 8-9 per cent annual growth rate found by Cortés Conde is mainly the result of his mistaking an increase in the amount of goods being taxed with the amount actually being produced, particularly for the case of wine. An alternative index calculated from a range of available data suggests a lower annual growth rate of around 5 per cent. While this result is only approximate, given the problems of data quality and coverage, it is more realistic than the higher growth rate suggested by Cortés Conde.

Scholars – including, presumably, Cortés Conde himself – are likely to have accepted the higher growth rate because it agrees with the optimistic account of Argentina's late nineteenth century that has come to dominate the historiography. As they were referenced in other scholars' work, Cortés Conde's numbers became an accepted part of the existing literature. They were, for instance, reproduced in a widely read collection of essays on Argentina's (new) economic history,[50] from where they migrated to a major study of industrialisation across the global periphery.[51] As Platt pointed out, this is how Mickey Mouse numbers spread and become reified as accepted facts.[52] For (neo)liberal historians, the evidence of Argentina's rapid industrialisation helped end (in their favour) a long-standing debate on the country's late nineteenth-century development. The implication was that Argentina industrialised due to the linkages formed with export-led growth. Implicitly, but crucially, this meant that there was no need for the state to pursue an interventionist industrial policy, as

49. Rocchi, *Chimneys in the Desert*.
50. Barbero and Rocchi, 'Industry', p. 265, Table 9.2.
51. A.S. Bénétrix, K.H. O'Rourke, and J.G. Williamson, 'The Spread of Manufacturing to the Poor Periphery 1870–2007', *Open Economies Review*, 26:1, 2015.
52. Platt, *Mickey Mouse Numbers.*

nationalists had previously argued.[53] Here it has been shown that Cortés Conde's apparently decisive contribution to that debate was in fact a case of Mickey Mouse numbers, while alternative data suggest a much lower rate of industrial growth, reinforcing the impression that a lack of industrial policy inhibited industrialisation.

Looking beyond Argentina's historiography, this paper also has implications for the wider study of economic history. Since the 'cliometric revolution' of the 1970s, the demand for historical statistics has increased dramatically, so it has become imperative to produce more numbers, with few raising concerns about the margins of error that they contain. As Angus Maddison reportedly put it, the general attitude has been that 'any number is better than no number'.[54] Some have defended this attitude by arguing that the margins of error are so small that they will not effect the analysis,[55] yet the case of Argentina's industrial output demonstrates how misleading bad numbers can be.[56] The danger of Mickey Mouse numbers, then, is that they will be accepted as fact without the necessary checks being made. It seems likely that any number may not always be better than no number.

A possible rebuttal is that it is only in response to bad numbers that good numbers will ever be produced.[57] The alternative industrial output index presented here could, for instance, be taken as evidence of that. Yet, as has been discussed, that index still suffers from the twin problems of quality and coverage because adequate data simply do not exist to reliably measure Argentina's industrial output in this period. Many of the series included in the alternative index are of dubious reliability and in any case they only cover around 60 per cent of value added in their base year. Thus, while the index is preferable to Cortés Conde's earlier attempt, it is far from perfect. At best, it can be said to show that industrial output probably grew at roughly 5 per cent per year from the 1870s to 1913, although even this highly qualified conclusion should still be met with the skepticism that it deserves.

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53. For instance, A. Ferrer, *The Argentine Economy*, Berkeley, 1967, pp. 122-23.
54. Reported by P. O'Brien, 'Myths of Eurocentrism and Material Progress', Institute of Historical Research Global History Seminar, 17 February 2010, online at: http://www.history.ac.uk/podcasts/global-history-external/myths-eurocentrism-and-material-progress (accessed 15 August 2015).
55. N.F.R. Crafts, '*Mickey Mouse Numbers in World History: The Short View* by D.C.M. Platt', *Journal of Economic Literature*, 30:1, 1992.
56. It is also notable that the historiography of the British industrial revolution has been greatly revised by a simple reweighting of textiles in an industrial output index. See N.F.R. Crafts and C.K. Harley, 'Output Growth and the British Industrial Revolution: A Restatement of the Crafts-Harley View', *Economic History Review*, 45:4, 1992.
57. R. Middleton, '*Mickey Mouse Numbers in World History: The Short View* by D.C.M. Platt', *English Historical Review*, 106:421, 1991.

Appendix: Indicators of Argentina's Industrial Output, 1869-1913

In Table A1 the 16 indicators included in the new industrial output index are reproduced as quantity relatives, with each referenced so that 1913 equals 100. For details of each indicator, see Table 5 above. The data and calculations underlying each indicator can be seen in the accompanying workbooks.[58]

58. Available online at http://www.joefrancis.info/data/Francis_Arg_ind_v2.xlsx and http://www.joefrancis.info/data/Francis_Arg_textiles.xlsx.

Table A1

Indicators of Argentina's Industrial Output, 1869-1913 (1913 = 100)

	Index	Beef products	Beer	Clothing	Cottage yarn and cloth	Dairy	Factory cloth	Flour	Flour products
1869					416.8				
1870					402.1				
1871					387.8				
1872					374.1				
1873					360.9				
1874					348.1				
1875		25.2			335.8	5.5			
1876	12.4	24.3	12.4		323.9	8.3		5.0	6.4
1877	15.1	25.9	12.3		312.5	8.7		5.8	7.0
1878	14.6	25.0	16.8		301.4	8.4		6.6	7.4
1879	15.1	24.4	6.2		290.7	9.8		6.3	7.4
1880	14.8	22.0	4.1		280.5	10.6		10.2	11.8
1881	16.9	22.2	8.5		270.5	9.6		11.3	13.5
1882	18.1	24.2	7.3		261.0	9.7		12.3	14.5
1883	17.9	26.2	6.1	86.9	251.7	10.4		10.7	12.2
1884	18.6	26.6	3.7	104.2	242.8	10.0		10.1	11.2
1885	20.9	30.4	8.2	100.3	234.2	11.1		14.7	16.0
1886	25.9	34.4	14.3	117.4	225.9	11.8		20.4	22.9
1887	22.5	33.0	9.2	92.7	217.9	10.4	1.4	11.5	12.6
1888	25.2	34.2	16.7	79.5	210.2	12.1	1.3	19.4	21.7
1889	28.1	38.6	14.9	50.8	202.8	13.6	0.5	34.2	39.2
1890	28.7	37.9	20.2	96.4	195.6	16.4	0.7	26.3	29.0
1891	24.6	42.7	11.5	52.5	188.7	21.0	1.6	24.8	27.8
1892	27.5	36.4	11.2	65.8	182.0	21.0	2.7	28.1	30.2
1893	27.9	35.9	11.7	90.1	175.6	21.0	4.3	31.9	32.1
1894	30.6	30.4	17.5	88.0	169.4	22.0	10.8	34.1	34.3
1895	33.0	34.2	13.3	102.4	163.4	26.5	12.2	36.8	35.8
1896	35.6	34.5	17.6	82.7	159.0	30.6	21.5	38.6	38.1
1897	38.3	33.1	17.6	109.6	154.7	29.1	23.9	40.0	41.1
1898	40.8	33.8	16.7	98.2	150.5	32.7	28.7	41.4	43.9
1899	44.0	34.8	18.8	94.3	146.5	35.3	37.6	48.7	48.9
1900	40.1	32.9	30.9	142.8	142.6	34.8	35.8	41.7	41.8
1901	47.6	36.3	26.9	129.8	138.7	39.4	33.3	63.1	64.0
1902	42.7	42.0	32.6	149.8	135.0	60.2	42.6	41.7	43.4
1903	49.6	40.2	26.4	145.6	131.4	76.7	53.2	58.2	58.2
1904	61.8	49.9	47.0	204.5	127.8	74.0	69.2	62.1	58.4
1905	65.6	62.9	41.8	264.4	124.4	75.1	73.8	60.2	51.4
1906	67.0	57.7	69.6	201.3	121.0	67.0	73.7	74.5	70.0
1907	63.1	57.3	51.7	145.9	117.8	58.7	56.1	76.2	72.1
1908	66.4	61.0	46.4	106.1	114.6	62.7	50.7	75.9	73.6
1909	74.6	69.9	64.6	172.9	111.5	66.6	71.7	77.3	74.8
1910	86.5	80.1	71.3	154.2	108.5	68.3	67.2	82.0	80.3
1911	92.4	91.7	77.7	165.3	105.6	74.0	75.9	91.7	91.2
1912	102.4	100.4	98.3	219.1	102.8	93.4	91.6	99.5	98.5
1913	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table A1 (cont.)

	Iron and steel	Matches	Paper	Printing	Sacks	Sugar	Tobacco	Wine
1869								
1870								
1871								
1872						1.1		
1873						1.3		
1874						1.5		
1875						1.8		
1876	2.7					2.1	14.8	4.3
1877	3.7					2.5	27.0	4.7
1878	3.5					2.9	19.2	5.1
1879	3.3					3.5	21.1	5.5
1880	3.8				2.2	4.1	19.3	6.0
1881	5.2				3.0	4.8	30.0	6.6
1882	6.8				4.0	5.7	28.1	7.2
1883	9.5			8.8	5.4	6.7	34.7	7.8
1884	14.5			8.5	7.7	7.9	27.0	8.5
1885	13.9			14.5	8.7	9.3	31.3	9.2
1886	19.1			12.8	8.1	11.0	46.8	10.1
1887	15.2			27.6	12.3	12.9	39.4	11.0
1888	28.0			22.5	10.6	15.2	36.3	11.9
1889	37.1			13.9	14.8	18.0	37.3	13.0
1890	10.1			16.5	15.2	21.2	57.1	13.8
1891	5.3			14.8	12.3	25.0	32.5	14.6
1892	11.9		7.3	8.9	19.5	29.5	51.0	15.5
1893	13.8	8.9	16.5	18.1	21.7	34.7	19.9	16.4
1894	18.7	27.7	11.2	30.0	25.3	41.0	23.4	17.4
1895	14.7	29.6	13.5	19.6	24.0	47.4	33.0	18.4
1896	17.4	38.6	19.9	20.2	31.2	55.9	40.7	19.5
1897	13.7	24.0	11.8	32.4	16.6	65.9	42.0	21.1
1898	17.9	24.8	26.2	28.4	24.8	77.7	44.5	22.9
1899	15.6	39.9	18.5	24.1	38.9	91.6	43.8	24.9
1900	17.4	34.2	22.0	36.3	27.3	42.7	46.7	23.1
1901	20.6	46.3	19.1	38.6	31.7	57.6	49.5	37.0
1902	14.2	36.5	21.2	36.2	30.7	44.9	32.8	27.3
1903	23.7	31.4	37.7	38.1	51.3	52.1	44.4	37.9
1904	39.4	53.6	49.8	72.2	71.1	46.7	78.0	34.9
1905	34.5	54.7	43.8	69.3	50.3	49.4	81.2	36.8
1906	49.9	63.6	53.0	96.4	41.4	42.5	57.1	48.6
1907	43.4	91.9	57.9	88.4	56.7	39.9	65.2	52.5
1908	45.6	84.2	56.6	95.8	66.7	58.5	82.6	57.0
1909	55.0	67.7	48.0	117.5	64.0	45.2	113.7	46.9
1910	85.3	124.8	82.6	196.5	55.7	53.1	96.3	68.1
1911	78.6	105.2	75.8	208.7	40.4	63.8	92.7	75.8
1912	94.3	134.5	62.3	189.9	71.3	53.6	105.8	85.4
1913	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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